

In re Patent Application Serial No. 09/599,269
 Response dated March 15, 2004
 Reply to Office Action of December 11, 2003

Page 9 of 20

Remarks/Arguments

For all the reasons provided below, supplementing those laid out in the Response of September 8, 2003, claims 1-4, 6-7, 9-15, 17-25, 27 and 29-31 of this application, as currently pending, are patentable. The claimed invention is a significant advance in the art, overcoming persisting problems and providing advantages not previously available in the field of annular pleated filter cartridges. The evidence, particularly as now supplemented, shows that the claimed invention was not obvious in light of Gsell et al. in view of Marshall et al.

Turning now to the PTO action, claims 1-4, 6, 7, 9-13, 22, 23, and 29-31 stand rejected under 35 USC §103(a) as unpatentable over Gsell et al. in view of Marshall et al. Applicant respectfully traverses this rejection; much of the discussion relates to the two independent claims.

The Examiner Is Correct in Acknowledging the Radical Difference Between the Material of the Gsell et al. Patent and That in Applicant's Claims.

Applicant thanks the Examiner for noting, as earlier noted with respect to Stoyell et al. '047 patent when the earlier rejection based on Stoyell et al. in view of Marshall et al. was lifted, that Gsell et al. (like Stoyell et al.) involves a *non-woven* material which, as in other non-woven-using annular pleated filter cartridges of the prior art, is more than an order of magnitude thicker than the material in applicant's claimed annular pleated filter cartridge. The Examiner, at ¶28 (pages 17-18) of the present PTO action, agrees that "Gsell et al. have disclosed or taught a filter material which is thicker (i.e., 17 times thicker) than what is claimed [by applicant]"

The material required by independent claims 1 and 23, and thus all of applicant's claims, is radically different from the material disclosed in the Gsell et al. patent. The Gsell et al. non-

In re Patent Application Serial No. 09/599,269
 Response dated March 15, 2004
 Reply to Office Action of December 11, 2003

Page 10 of 20

woven material is *not* a Tyvek, nor for that matter is it even polyethylene; instead, it is polyethylene terephthalate (PET) or poly-butylene terephthalate (PBT). As earlier pointed out with respect to thickness, even the very thinnest non-woven material contemplated in Gsell et al. is *nearly 17 times thicker* than the very thickest Tyvek material of applicant's claimed invention, which requires a particular material "having a thickness of less than about 0.15 mm."

In other words, the Gsell et al. patent, like the Stoyell et al. patent, is fully consistent with the prior art as presented and discussed in the instant patent application and during prosecution. Thick non-woven materials are seen in annular pleated filter cartridges, but the claimed Tyvek material is so very flimsy and different in nature that the person or ordinary skill in the art related to annular pleated filter cartridges would not have considered it a candidate for filter medium in this special class of products.

For all the unobviousness reasons given with respect to the earlier Stoyell-based rejection, the current rejection based on Gsell et al. in view of Marshall et al. should be lifted.

**The Contention That the Evidence
 in the Earlier Mayer Declaration Is
 Immaterial Is Factually Inaccurate.**

The Examiner addresses applicant's use of Dr. Mayer's earlier declaration (November 28, 2001) as support for applicant's unobviousness arguments by contending that:

[T]he reference (Marshall et al.) is actually disclosing a (different entity from TYVEK) filter sheet material that has strength, weight and barrier properties which is (sic) at least equivalent to that of the TYVEK sold by DuPont, but has a significantly improved air and liquid permeability (see page 2, last paragraph of Marshall et al.), thereby creating a more efficient filter product (therefore, *not the same TYVEK material which has been exhaustively discussed in applicant's arguments and talked about by the Declaration by Ernie Mayer from DuPont*).

In re Patent Application Serial No. 09/599,269
 Response dated March 15, 2004
 Reply to Office Action of December 11, 2003

Page 11 of 20

(emphasis added) To summarize, the Examiner asserts: (1) that the Marshall et al. document discloses a material *other than* TYVEK sold by DuPont; and, more to the point, (2) that the material disclosed in the Marshall et al. document is *not* the material talked about in Dr. Mayer's earlier Declaration. Thus, the Examiner discounts the earlier Mayer declaration as "immaterial."

This factual contention is simply wrong, as clearly demonstrated by the Supplemental Declaration of Ernest Mayer, submitted herewith. In his supplemental declaration, Dr. Mayer, indicates his full awareness of the Marshall et al. document, which is owned by DuPont, and states that the Examiner's assertions "are in fact wrong." (See ¶¶4 and 5.) Dr. Mayer goes on to state in ¶5 that, "The material disclosed in Marshall et al. is TYVEK Soloflo sold by DuPont, and it is precisely the material referred to in my Declaration of November 28, 2001 -- as the TYVEK used in the unique annular pleated filter cartridges of the Rose patent application." Thus, it is clear that the earlier Mayer declaration, not to mention the present declaration, is *highly material* to the unobviousness of applicant's claimed invention over Gsell et al. in view of Marshall et al.

The Supplemental Mayer Declaration Also Makes His Earlier Factual Evidence of Unobviousness of the Invention Over Typical Non-Woven-Using Annular Pleated Filter Cartridges Directly Applicable to the Present Rejection.

Paragraphs 12-14 and 16-17 of the earlier Mayer declaration (*see attached copy*) specifically deal with the issue of prior annular pleated filter cartridges using non-woven materials, and in doing so give factual evidence of the unobviousness of applicant's invention over such cartridge prior art in view of disclosures of the Tyvek material used in applicant's invention. At the time of that declaration, the rejection over Gsell et al. in view of Marshall et al. had not been

In re Patent Application Serial No. 09/599,269
 Response dated March 15, 2004
 Reply to Office Action of December 11, 2003

Page 12 of 20

asserted; however, applicant was aware of such prior art. And, prior to assertion of the current rejection, the claims were rejected on the basis of Stoyell et al. (which also involves a typical non-woven) in view of Marshall et al., and such rejection was overcome.

In any event, Dr. Mayer's supplemental declaration, now submitted, gives evidence *with respect to Gsell et al. in view of Marshall et al.* that Mayer has already given more generally. In his supplemental declaration, after showing his familiarity with Gsell et al. (¶7) and Marshall et al. (¶5), Dr. Mayer lays out in ¶¶8-13 specific factual bases for the unobviousness of the claimed invention over Gsell et al. in view of Marshall et al. These paragraphs speak for themselves, and are fully consistent with the facts and positions in Dr. Mayer's earlier declaration. However, a brief discussion may be useful.

Dr. Mayer points out the extreme thinness and nature of the Tyvek material of the claimed annular pleated filter cartridge, and notes that this makes such material "so very flimsy and different in nature from the non-woven material of the Gsell et al. patent that the person of ordinary skill in the art of annular pleated filter cartridges would not have considered it for this class of products." The Examiner's present acknowledgment of the extreme difference in material thickness, together with Dr. Mayer's evidence concerning the flimsy nature of such material and the perception of such material because of this characteristic, are significant points bearing on patentability. Unobviousness is established.

Dr. Mayer provides factual evidence of particular problems with non-woven-using pleated annular filter cartridges. He points to "particular problems and concerns relating to a difficulty of reliably achieving appropriate scaling of the pleated ends of a pleated non-woven

In re Patent Application Serial No. 09/599,269
 Response dated March 15, 2004
 Reply to Office Action of December 11, 2003

Page 13 of 20

with cartridge endcaps, as is absolutely essential in order to avoid by-pass of the filter." He indicates that "those skilled in the art of annular pleated non-woven filter cartridges would typically believe that the Tyvek non-woven material referred to in the Rose patent application would not reliably achieve the end sealing relationship that is essential for annular pleated filter cartridges" , and that such "Tyvek material would not be considered appropriate for annular pleated filter cartridges." Furthermore, he indicates that "[g]iven such thinness and the nature of such material, the use of such fragile material for an annular pleated filter cartridge would be contra-indicated to a person of ordinary skill in the art because such material would not be thought reliably capable of successful lengthwise bonding (Tyvek-to-Tyvek) as necessary for formation of an annular pleated filter cartridge for liquid filter use."

Dr. Mayer, consistent with his earlier-submitted declaration, summarizes his factual evidence on unobviousness by stating that persons "made aware of characteristics of the Tyvek material, would not, because of its nature, regard such Tyvek material as a material usable in connection with creation of an annular pleated non-woven filter cartridge," and that, "given the low firmness (high flexibility) of such filter material, and the extreme material thinness which exacerbates such flexibility, the ability for such material to be formed successfully into an annular pleated filter cartridge was not and would not have been apparent to a person of ordinary skill in the art."

To the person of ordinary skill in the art, applicant's claimed invention would not have been obvious. The invention is a significant breakthrough in the field of annular pleated filter cartridges, and provides important advantages.

In re Patent Application Serial No. 09/599,269
 Response dated March 15, 2004
 Reply to Office Action of December 11, 2003

Page 14 of 20

**Further Fact-Based and Law-Based Arguments
 for the Unobviousness of the Claimed Invention
Over Gsell et al. in View of Marshall et al.**

Applicant's invention addresses several problems of the prior art, including those described in applicant's specification. In particular, the Background and Objects sections of applicant's specification describe a continuing need for pleated annular filter cartridges with a pleated structure having an increased surface area for a given circumferential dimension of the pleated element -- or, stated differently, increased filter surface area for an annular pleated filter cartridge of given diameter. The subsequent description explains how conventional filter elements of annular pleated filter cartridges, such as those disclosed in the Gsell et al. patent, are constructed and why corresponding factors limit the pleat density (i.e., the number of pleats for a given circumferential dimension), and thus tend to limit the area of the pleated structure accessible to liquid flow.

Applicant's specification also details another shortcoming of certain annular pleated filter cartridges of the prior art -- namely, the requirement of frequent replacement, i.e., replacement at intervals shorter than may be desired. The subsequent discussion in the specification includes the example of degradation in conventional pleated filter elements.

Applicant's specification also describes an on-going need for highly-effective, long-lasting annular pleated filter cartridges which are relatively inexpensive.

There would have been no motivation or suggestion to have modified the Gsell et al. reference as the Examiner suggests. The prior art must suggest the desirability of the claimed

In re Patent Application Serial No. 09/599,269
 Response dated March 15, 2004
 Reply to Office Action of December 11, 2003

Page 15 of 20

invention and, since such motivation to combine references has not been identified, the present rejection fails to present a *prima facie* case of obviousness.

The Federal Circuit has held in particular that, "[t]here are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art." *In re Rouffet*, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998) (cited in MPEP §2143.01). This three-part test is now applied to the present case.

In our case, applicant's specification identifies problems associated with conventional annular pleated filter cartridges such as that filter disclosed in Gsell et al. Rather than suggesting any motivation for modifying an annular pleated filter cartridge, the Gsell et al. patent presents a cartridge that exhibits the problems that need to be solved.

Regarding the teachings of the prior art, the PTO action states (at pages 4-5), "It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the pleated filter cartridge of Gsell et al., by substituting the ... filter sheet material of Marshall et al., in order to provide an alternative and improved filter material for the cartridge which has improved ability to remove very small micronic size range particulates in sizes of 1-2 microns at an efficiency of at least 99% as well as good barrier and strength properties and does not require laminations or other support structures, as in pages 1-10 of Marshall et al."

Applicant respectfully submits that there is no support in either of the applied references to modify or combine them as indicated in the present PTO action. Accordingly, the teachings of the prior art of record fail to show a motivation to combine. *See, e.g., In re Linter*, 173 USPQ

In re Patent Application Serial No. 09/599,269
 Response dated March 15, 2004
 Reply to Office Action of December 11, 2003

Page 16 of 20

560, 562 (CCPA 1972) and *In re Fine*, 5 USPQ2d 1596 (Fed. Cir. 1988), each of which is cited in MPEP §2143.01. In addition, "[t]he mere fact that references *can* be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." *In re Mills*, 16 USPQ2d 1430 (Fed. Cir. 1990) (cited in MPEP §2143.01).

Regarding the independent claims, the PTO action fails to indicate how the level of ordinary skill in the art was determined. Therefore, the present rejection fails to meet the evidentiary requirement of showing a motivation to combine for the hypothetical artisan. In addition, applicant has presented into the record declarations of an expert in the art that include relevant evidence, who states:

"Based on my experience in the art, those skilled in the art of annular pleated non-woven filter cartridges would typically believe that the Tyvek non-woven material referred to in the Rose patent application would not reliably achieve the end sealing relationship that is essential for annular pleated filter cartridges, and would thus turn to other thicker, bulkier non-woven materials. The Tyvek material is highly flexible, and to persons of ordinary skill in the art such thin flexible Tyvek material would not be considered appropriate for annular pleated filter cartridges."

(Ernest Mayer Supplemental Declaration, at ¶10).

The Examiner may not rely on inadmissible hindsight reasoning as has been done in the §103 rejection, instead of making a showing of a suggestion or motivation, such as by citing an appropriate reference to support her position (case citations omitted). MPEP §2141.01.

In other words, neither applied reference would have suggested the combination of claim limitations; see *In re Donohue*, 226 USPQ 619, 621 (Fed. Cir. 1985). And neither reference identifies any of the problems addressed by the subject invention. If there is no evidence that an

In re Patent Application Serial No. 09/599,269
 Response dated March 15, 2004
 Reply to Office Action of December 11, 2003

Page 17 of 20

artisan would have expected a problem to exist at all, then it is not proper to conclude that an invention that solves this problem would have been obvious to the hypothetical ordinarily skilled artisan. *In re Nomiya, Kohisa, and Matsumura*, 184 USPQ 607, 612-613 (CCPA 1975). It follows that an invention which solves such problem constitutes "unexpected results."

Thus, the claimed subject matter *as a whole* would not have been obvious to an ordinarily skilled artisan viewing the applied references. 35 USC §103, as interpreted in MPEP §2141; MPEP §2141.02. Since the relevant §103 inquiry is not whether differences between the prior art and the claims would have been obvious, but instead is whether the claimed invention as a whole would have been obvious, the present ground of rejection fails to identify any motivation or suggestion to have achieved the claimed invention. This is because the Examiner may not "pick-and-choose" limitations from various references. The PTO action has failed to identify any motivation or suggestion other than by using impermissible hindsight reasoning.

The three-prong test for motivation (*In re Rouffet, supra*) has not been met. In our case, the Examiner relied upon none of these sources for identifying a motivation, and may not merely state unsupported hindsight reasons.

For these additional reasons, the §103 rejection fails to identify in the prior art a motivation to modify the applied references or to combine the reference teachings. Therefore, the §103 rejection fails to establish a *prima facie* case of obviousness. MPEP §§2142 and 2143 (citations omitted). Claims 2-4, 6, 7, 9-13, 22, 23, and 29-31 are patentable at least by virtue of their dependencies from independent claims 1 and 23. For these reasons, applicant respectfully requests that the §103 rejection of claims 1-4, 6, 7, 9-13, 22, 23, and 29-31 be withdrawn.

In re Patent Application Serial No. 09/599,269
 Response dated March 15, 2004
 Reply to Office Action of December 11, 2003

Page 18 of 20

Claims 18-21 are rejected under 35 USC 103(a) as unpatentable over Gsell et al. in view of Marshall et al. and further in view of Pall '881 and Hawley's Condensed Chemical Dictionary. This rejection is respectfully traversed in view of all of the above discussion, which relates to claim 1 on which claims 18-21 depend.

Claims 14-15, 17, 24-25 and 25 are rejected under 35 USC 103(a) as unpatentable over Gsell et al. in view of Marshall et al. and further in view of Ethylene Polymers, LDPE, Ethylene Polymers, HDPE and Miller '207. This rejection is respectfully traversed in view of all the above discussion, which relates to independent claims 1 and 23 on which these claims depend.

While the patentability of the dependent claims stand based on the patentability of the independent claims -- both on the failure to make a *prima facie* case for obviousness for such claims and, importantly, on factually-supported unobviousness in light of the evidence submitted, it should be noted that it appears that these rejections are based on impermissible hindsight gleaned from applicant's invention. In the many references relied on, there is no addressing of existing needs of conventional annular pleated filter cartridges; there is no indication of any motivation from the references for modifying or combining.

"As the [Federal Circuit] court has stated, 'virtually all [inventions] are combinations of old elements.' *Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 698, 218 USPQ 865, 870 (Fed. Cir. 1983); *see also Richdel, Inc. v. Sunspool Corp.*, 714 F.2d 1573, 1579-80, 219 USPQ 8, 12 (Fed. Cir. 1983) ('Most, if not all, inventions are combinations and mostly of old elements.')." Therefore, an Examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate

In re Patent Application Serial No. 09/599,269
 Response dated March 15, 2004
 Reply to Office Action of December 11, 2003

Page 19 of 20

patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an Examiner to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. Such an approach would be "an illogical and inappropriate process by which to determine patentability." *Sensonics, Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1570, 38 USPQ2d 1551, 1554 (Fed. Cir. 1996).

All of applicant's pending claims meet the tests of patentability for the reasons set forth above.

At ¶29 of the PTO action, the Examiner, referring to 37 CFR §1.111(b), suggested that applicant's earlier Response was unacceptable as being merely a "general allegation that the claims define a patentable invention without specifically pointing to how the language of the claims patentably distinguishes them from the references." Applicant respectfully disagrees -- both with respect to the prior Response and certainly with respect to the present Response. The Tyvek filter material, defined with specificity in applicant's independent claims, differs in such specificity and, dramatically, in its thinness. Its inherent flimsiness is pointed out as a difference, and factual evidence of unobviousness has been provided. Rule 111(b) is fully complied with.

Furthermore, applicant has shown that no *prima facie* case of obviousness has been made, given the lack of motivation in the references. When considered as a whole, applicant's invention, as set forth in the pending claims, is unobvious -- because of, *inter alia*, long-felt need, its providing solutions to problems of conventional annular pleated filter cartridges, and the

In re Patent Application Serial No. 09/599,269
Response dated March 15, 2004
Reply to Office Action of December 11, 2003

Page 20 of 20


additional factual evidence of unobviousness provided in the supplemental declaration of Dr. Mayer.

In summary, applicant's invention is a very significant advance in the annular pleated filter cartridge art, and provides advantages not previously available. As amply demonstrated, the invention as defined in the pending claims is unobvious; all claims are patentably distinct over the prior art. Reconsideration is respectfully requested.

The Office is authorized to charge the small-entity one-month extension fee against Deposit Account No. 10-0270.

The Examiner is invited to call the undersigned attorney if that would be helpful in facilitating resolution of any issues which might remain.

Respectfully submitted,


Peter N. Jansson
Registration No. 26,185

Dated: March 15, 2004

Jansson, Shupe & Munger, Ltd.
245 Main Street
Racine, WI 53403-1034
Attorney Docket No. OF-102US

CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that the following documents: (1) Transmittal Letter; (2) Amendment Transmittal Letter; (3) Amendment; (4) Declaration of Ernie Mayer all involving Serial No. 09/599,269 are being facsimile transmitted to Examiner Marianne Ocampo, Group Art Unit 1723 at the U.S. Patent and Trademark Office, fax # 703/872-9316, on March 16, 2004.



In re Patent Application Serial No. 09/599,269

Applicant: Rose

SUPPLEMENTAL DECLARATION OF ERNEST MAYER

I, Ernest Mayer, hereby declare as follows:

1. I am Senior Consultant at the DuPont PARSAT Center, Wilmington, Delaware, and have been employed by E.I DuPont de Nemours and Co. in that capacity for many years.

2. I received my B.S. and M.S. degrees in chemical engineering from Columbia University in New York City. I received by Ph.D. degree in chemical engineering from the University of Delaware, Newark, Delaware.

3. This declaration is in support of patent application Serial No. 09/599,269 of Rose, entitled "Annular Pleated Filter Cartridge for Liquid Filtration Apparatus," and is for submission by applicant with a Response filed by Rose on or about March 11, 2004. This declaration supplements my earlier declaration of November 28, 2001, a copy of which is attached.

4. I have read the PTO action of December 11, 2003. In particular, I have seen the Examiner's statements on pages 4 and 16-17 of such action, concerning DuPont's Marshall et al. (WO 905) PCT international publication, asserting that:

[The reference (Marshall et al.) is actually disclosing a (different entity from TYVEK) filter sheet material that has strength, weight and barrier properties which is (sic) at least equivalent to that of the TYVEK sold by DuPont, but has a significantly improved air and liquid permeability (see page 2, last paragraph of Marshall et al.), thereby creating a more efficient filter product (therefore, not the same TYVEK material which has been exhaustively discussed in applicant's arguments and talked about by the Declaration by Ernie Mayer from DuPont).

(emphasis added) In short, the Examiner appears to assert that: (1) the Marshall et al. patent document discloses a material *other than* TYVEK sold by DuPont; and (2) the material disclosed in the Marshall et al. patent document is *not* the material talked about in my earlier Declaration.

5. I am aware of and have reviewed the Marshall et al. patent document and note that these assertions by the Examiner in the PTO action are in fact wrong. The material disclosed in Marshall et al. is TYVEK Soloflo sold by DuPont, and it is precisely the material referred to in my Declaration of November 28, 2001 -- as the TYVEK used in the unique annular pleated filter cartridges of the Rose patent application.

6. I have read the currently-pending claims of Rose patent application. Until the Rose invention, there were no annular pleated liquid filtration cartridges utilizing a TYVEK material as the filtration medium. Nor would such annular pleated filter cartridges have been obvious to the person of ordinary skill in the art, including for reasons elaborated upon below.

7. I have also read Patent No. 5,528,127 (Gsell et al.). The Gsell et al. patent, like others, discloses a non-woven filter material in an annular pleated filter cartridge. The Gsell et al. material is not a Tyvek, nor is it even a polyethylene; it is a polyethylene terephthalate (PET) or polybutylene terephthalate (PBT). Of greatest significance, however, is that even the thinnest non-woven material contemplated by Gsell et al. is nearly 17 times thicker than the very thickest of the Tyvek material in Rose's claims, which require that the material have "a thickness of less than about 0.15 mm."

8. The extreme thinness and nature of the Tyvek material of the claimed annular pleated filter cartridge makes such material so very flimsy and different in nature from the non-woven material of the Gsell et al. patent that the person of ordinary skill in the art of annular pleated filter cartridges would not have considered it for this class of products.

9. The Gsell et al. patent is an example of pleated non-woven filter cartridges utilizing non-woven filter materials, such as of polypropylene, nylon and various polyesters that are significantly thicker and bulkier than the Tyvek material used in the unique annular pleated filter cartridges of the Rose patent application. Until creation of the present Rose invention there were no annular pleated liquid filtration cartridges utilizing Tyvek, including a Tyvek as described in the Rose claims, as the filtration medium.

10. Pleated annular filter cartridges of the type having non-wovens for filtration have particular problems and concerns relating to a difficulty of reliably achieving appropriate sealing of the pleated ends of a pleated non-woven with cartridge endcaps, as is absolutely essential in order to avoid by-pass of the filter. Based on my experience in the art, those skilled in the art of annular pleated non-woven filter cartridges would typically believe that the Tyvek non-woven material referred to in the Rose patent application would not reliably achieve the end sealing relationship that is essential for annular pleated filter cartridges, and would thus turn to other

Ernest Mayer Supplemental Declaration

Page 3 of 3

thicker, bulkier non-woven materials. The Tyvek material is highly flexible, and to persons of ordinary skill in the art such thin flexible Tyvek material would not be considered appropriate for annular pleated filter cartridges.

11. The Tyvek material of the annular pleated filter cartridge of the Rose patent application is very thin -- preferably less than about 0.15 mm thick and most preferably less than or equal to about 0.13 mm thick. Given such thinness and the nature of such material, the use of such fragile material for an annular pleated filter cartridge would be contra-indicated to a person of ordinary skill in the art because such material would not be thought reliably capable of successful lengthwise bonding (Tyvek-to-Tyvek) as necessary for formation of an annular pleated filter cartridge for liquid filter use.

12. Persons of ordinary skill in the art, who are aware of the nature of the problems typically associated with manufacture of annular pleated non-woven filter cartridges and made aware of characteristics of the Tyvek material, would not, because of its nature, regard such Tyvek material as a material usable in connection with creation of an annular pleated non-woven filter cartridge.

13. More specifically, given the low firmness (high flexibility) of such filter material, and the extreme material thinness which exacerbates such flexibility, the ability for such material to be formed successfully into an annular pleated filter cartridge was not and would not have been apparent to a person of ordinary skill in the art.

* * * * *

All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true; such statements were made with the knowledge that willful false statements are punishable by fine or imprisonment or both (18 USC 1001) and jeopardize the validity of the application or any patent issued thereon.

Dr. Ernest Mayer 3/11/04
Ernest Mayer, Ph.D.

Dated: March 11, 2004

Patent Application Serial No. 09/599,269

Applicants: Rose et al.

DECLARATION OF ERNEST MAYER

I, Ernest Mayer, hereby declare as follows:

1. I am Senior Consultant at the DuPont PARSAT Center, Wilmington, Delaware, and have been employed by E.I DuPont de Nemours and Co. in that capacity for many years.

2. I received my B.S. and M.S. degrees in chemical engineering from Columbia University in New York City. I received by Ph.D. degree in chemical engineering from the University of Delaware, Newark, Delaware.

3. This declaration is in support of patent application Serial No. 09/599,269, of Rose et al., entitled "Annular Pleated Filter Cartridge for Liquid Filtration Apparatus," and is for submission by the applicants with an amendment filed by them on or about November 28, 2001. I have spoken with the inventors about the facts and arguments set forth in such amendment.

4. Throughout my career I have dealt with liquid filtration media. I am experienced in the particular field of liquid filtration apparatus of the sort involving annular pleated filter cartridges and am aware of the nature and performance of annular pleated filter cartridges, including those existing before the invention of the above-noted Rose et al. patent application.

5. I have read the principal claim, amended claim 1, as set forth in the aforementioned amendment, which is as follows:

1. A pleated filter cartridge for removing particulates from liquid, the pleated filter cartridge being of the type including a perforate core, a pair of endcaps, and an annular non-woven filter element around the core formed by substantially axially-parallel pleats of at least one sheet of filter material, the filter element having opposite ends each in sealing engagement with one of the endcaps, characterized in that the filter material is a non-perforated non-woven material of flash-spun plexifilamentary high-density polyethylene fibrils, the filter material having a pressure drop of less than 4 psid at a flow rate of 10 gal/hr and a filtration efficiency of at least 98% of 1-2 micron particulates at a pressure differential of 30 psid.

6. I have read Patent No. 5,154,827 (Ashelin et al.) and am familiar with the DuPont pamphlet entitled "Dupont TYVEK -- The Medium That Fits a Variety of Filtration Needs," the references mentioned in the above-noted amendment.

*copy - for attachment to
Mayer's supplemental declaration*

Ernest Mayer Declaration

7. My review of the Ashelin et al. patent shows at least two key things which make that reference not at all pertinent to the invention set forth in the Rose et al. patent application.

8. First, the Ashelin et al. filter is a membrane or film filter and is designed for removal of particles of a *radically smaller size range* than the particles removed by Rose et al. invention. More specifically, the reference at column 1, line 13 of the Ashelin et al. patent to filtration of particles as small as "about 0.001 microns" and the indication at column 1, lines 12-16 of the patent that removal of contaminants of this extremely small size is "often required in the electronics and pharmaceutical industries" show clearly that the Ashelin et al. patent is dealing in a different realm; it is not related to annular pleated filter cartridges of the type having *non-woven* filters, which handle high-volume flows. The Ashelin et al. membrane filter is used for removing contaminant particles that are *three orders of magnitude less* than the smallest particles typically dealt with in annular pleated cartridges using non-wovens.

9. Second, while the claimed invention relates to an improvement in annular pleated filter cartridges of the *non-woven* filter type, the Ashelin et al. annular pleated filter cartridge uses what are referred to as *membranes* or *films* as its filtering material, and these are completely different from the subject of the Rose et al. invention. The Ashelin et al. patent membranes are microporous fluoro-carbon film materials which have pores intended for capturing extremely tiny particles, and are far from the non-woven material of flash-spun plexifilamentary high-density polyethylene fibrils required in the annular pleated filter cartridges of the Rose et al. invention.

10. Annular pleated filter cartridges using microporous membranes or films are very different than annular pleated filter cartridges using non-wovens, and the Ashelin et al. patent has no bearing on particular problems such as those uniquely associated with annular pleated *non-woven* filter cartridges, which are in a separate category.

11. Another point emphasizing the non-pertinence of the Ashelin et al. filter material is the fact that it has, according to column 7, line 32, "three or more, e.g., up to as many as nine" sheets of filtration membrane in a lamination. Not only is this far more complex and expensive than applicants' claimed invention, but its very complexity emphasizes the non-pertinence of the Ashelin et al. patent. In contrast to the Ashelin et al. patent disclosure, applicants' claimed

- copy -

Ernest Mayer Declaration

annular pleated filter cartridge has a non-woven filter material which does not require multiple layers and often is preferably used in a single layer.

12. Annular pleated non-woven filter cartridges are known to utilize *non-woven* filter materials, such as of polypropylene, nylon and various polyesters, that are significantly thicker and bulkier than the Tyvek material used in the unique annular pleated filter cartridges of the Rose et al. patent application. Until creation of the present invention there were no annular pleated liquid filtration cartridges utilizing Tyvek as the filtration medium.

13. Pleated annular filter cartridges of the type having non-wovens for filtration have particular problems and concerns relating to a difficulty of reliably achieving appropriate sealing of the pleated ends of a pleated non-woven with cartridge endcaps, as is absolutely essential in order to avoid by-pass of the filter. Based on my experience in the art, those skilled in the art of annular pleated non-woven filter cartridges would typically believe that the Tyvek non-woven material referred to in the Rose et al. patent application would not reliably achieve the end sealing relationship that is essential for annular pleated filter cartridges, and would thus turn to other thicker, bulkier non-woven materials. The Tyvek material is highly flexible, and to persons of ordinary skill in the art such thin flexible Tyvek material would not be considered appropriate for annular pleated filter cartridges.

14. The Tyvek material of the annular pleated filter cartridge of the Rose et al. patent application is very thin -- preferably less than about 0.15 mm thick and most preferably less than or equal to about 0.13 mm thick. Given such thinness and the nature of such material, the use of such fragile material for an annular pleated filter cartridge would be contra-indicated to a person of ordinary skill in the art because such material would not be thought reliably capable of successful lengthwise bonding (Tyvek-to-Tyvek) as necessary for formation of an annular pleated filter cartridge for liquid filter use.

15. Because of the particular nature of the Ashelin et al. patent, as noted above, persons of ordinary skill in the art would not combine the disclosure of such patent with knowledge of the Tyvek material in creation of an annular pleated filter cartridge.

- copy -

Page 4 of 4

Ernest Mayer Declaration

16. Nor would persons of ordinary skill in the art, who are aware of the nature of the problems typically associated with manufacture of annular pleated non-woven filter cartridges and made aware of characteristics of the Tyvek material, regard such Tyvek material as a material reasonably usable in connection with creation of an annular pleated non-woven filter cartridge.

17. More specifically, given the low firmness (high flexibility) of such filter material, and the material thinness which exacerbates such flexibility, the ability for such material to be formed successfully into an annular pleated filter cartridge was not and would not have been apparent to persons of ordinary skill in the art.

* * * * *

All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true; such statements were made with the knowledge that willful false statements are punishable by fine or imprisonment or both (18 USC 1001) and jeopardize the validity of the application or any patent issued thereon.

Dr. Ernest Mayer
Ernest Mayer, Ph.D.

Dated: November 28, 2001

- copy -